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The Impact of Technovation and Collaboration on Strategic Service Classification in the Digital Economy

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Abstract — **Service organizations increasingly organize themselves and operate on a value chain level. This creates important challenges and opportunities, which call for a realignment of strategic focuses, in particular with respect to the impact of technovation on service creation and services modus operandi, their resulting service classification, and the restructuring amongst different service value chain industries. This research builds on a recently developed classification scheme, referred to as the Services Cubicle, that transcends current industry boundaries and includes upcoming service business trends in technovation. The paper subsequently illustrates a variety of service industry examples in order to clarify the resulting service classifications, taking into account deployment of varying degrees of technovation in that industry.**

Keywords — **service classification / taxonomy, services value chain, technovation, collaboration, digital economy**

I. INTRODUCTION

In today's service economy, innovations in technology and integration with computers and telecommunications are viewed not only as a powerful facilitating mechanism for service organizational growth, but in fact are a driver creating new service markets, transforming industries and seen as enablers for transforming the nature, content, context and scope of the service offerings.

Technovation in this context refers to innovation and creativity with or without the application of IT, e-commerce, telecommunications and information management, in conjunction with process, knowledge and relationship management; all of which are required in designing and managing a more effective and efficient service delivery channel in a fuzzy organizational setup. Recently [63] has emphasised the need for collaborative relationships with stakeholders as an important factor affecting innovation performance and productivity. In support of the above, [40] in particular, has examined knowledge creation activities of service firms and has found that collective knowledge mobilization and the sourcing of external knowledge from stakeholders is found to be more conducive to new service introductions and innovation success.

Due to increased proliferation of technological and IT advancements and the key role organizational behaviours and innovation have in gaining competitive advantage, researchers are starting to focus on the combined effects of these environmental, technological and service-specific attributes on the service industry. In response to these dynamics and to realise benefits from these multitude of factors, a number of industries such as the telecommunications, IT industry, law firms, restaurants and airlines are already moving away from traditional organizational structures. They are seen to be adopting clusters, value nets, value chains and holonic structures with fuzzy boundaries in a virtual or physical sense as evident in [65] [66] [58] [59] [50] [60] [84] [85] [86] and [41].

Moreover, many of today's services are increasingly market driven and are designed and delivered on a supply chain/value chain level (ie mobile services), hence include complexities of strategic alignment, value creation and positioning, asset definition and management, and the like.

The dynamic changes in organizational structures and the advent of technological advances in the services industry have broadened Schmenner's [69] conceptual service classification as shown in [1]. In there, the authors have examined the combined effect of technovation in a collaborating setting with service-specific attributes on service classification, resulting in a three-dimensional "Services Cubicle" taxonomy. A third dimension, titled "degree of technovation" (innovation, technological management, delivery channels and organizational structures), is added which, along with the "degree of relative throughput" (measured for a service transaction as compared to others in the industry) and "degree of variation" (customization for and interaction with customers), provides flexible and dynamic ways of classifying services in ways that transcend current industry boundaries, and one which addresses upcoming service business trends that deploy technology and e-commerce.

This research builds on the various dimensions underlying the development of this ever-changing service taxonomy, and focuses in particular on specific industry examples targeting the four quadrants of Schmenner's [69]

framework. It illustrates the applicability of the new classification scheme for service organizations, providing service organizations with a management tool which will assist managers to position, align, assess and validate the impact of their changing service offerings.

II. LITERATURE REVIEW

To-date services are categorised as pure services, or within the context of products viewed as bundles of physical goods and services, with service classifications made from various standpoints to enhance strategic thinking in services as shown by several researchers [34] [67] [68] [80] [14] [74] [75] [35] [10] [32] [31] [13] [22] [14] [79] [54] [16] [17] [18] [11] [19] [52] [76] [43] [44] [45] [53] [24] [39] [37] [48] [83] [6] [81] and [49].

At the same time of the development of service classification schemes, we witnessed the need to define service delivery processes from an operations and management perspective. In this context while the number of contributions are too numerous to elaborate on individually we list the contributions of several researchers [36] [20] [64] and [81]. Of particular interest is the work by Schmenner [69], who improved upon his own SPM framework [72], whilst applying the principles of the Theory of Swift, Even Flow [70] and [71] by retitling the axes of the SPM to degree of relative throughput (measured for a service transaction as compared to others in the industry) and degree of variation (customization for and interaction with customers) respectively. As this research provides the building block for development of the service cubicle classification, it will be further discussed below.

Schmenner's [72] SPM framework was subjected to a number of criticisms, i.e. interaction and customisation may not necessarily act in one direction [30]; straight-forward direction of causation from service encounter to service process choice [20]; capital-labour ratio not seen as the driver of a service classification with control of internal operations, and lack of theoretical evidence for the importance of the productivity diagonal [81] [76] and [36]. In response to these criticisms, Schmenner modified his 1986 framework using The Theory of Swift, Even Flow [70] and [71] resulting in a revised SPM [69]. He applies the Theory of Swift, Even Flow and states that the swifter and more even flow of information in service operations, the higher the productivity. The challenge therefore becomes to hunt for bottlenecks within the service production system, and making sure that throughput, in the form of customers or employees lacking knowledge, information, or instructions, does not accumulate. Schmenner's revised 2004 SPM framework redefines the axes of the service process matrix as degree of variation (customisation for and interaction with customers) and relative throughput (measured for a service transaction as compared to others in the industry) with the lure of the diagonal resulting in greater productivity.

To reaffirm the authors thinking in developing a service taxonomy using technovation and collaboration, [78] recently demonstrated in his empirical study how innovation by service firms differs from innovation in manufacturing, and argues that the currently dominant conceptual framework and empirical approaches need to be broadened to adequately capture innovation in services. Further, [78] points out that innovation in services brings to the floor "softer" aspects of innovation, based on the skill-set and inter-organizational norms, thus allowing for an innovation orientation towards "organizational changes", besides new innovation products and new production processes. Furthermore, a recent empirical study by [40] using survey data of 167 Finnish knowledge-intensive firms, examines collaborative knowledge creation activities in service firms. In here, it is empirically evident that collective application of knowledge more likely leads to significant improvement in services than individual application of knowledge and secondly, that external sourcing of knowledge from customers and competitors is more conducive to new service introductions than incremental learning on the job. As evident, the driving force behind these changes is the innovativeness of individuals, the business organizations and the innovation system [82], the distribution of knowledge across organizations [7], the "learning economy" [47] and "national systems of innovation" [46] [56] and [26]. As such innovation in services is largely dependent on adopting externally developed technologies that facilitate new service provision and/or enhance service productivity [62] and [77], resulting in scientific and technological breakthroughs in networks [12].

Further, a firm's recognition and requirement to collaborate formally or informally [25] and [63] in boosting significantly the innovation output and competitiveness of firms is seen in a diverse range of service industry settings [5] [23] and [9]. Also, [63] provides evidence for maintaining collaborative relationships with stakeholders as important factors affecting innovation performance and productivity.

Whilst limited evidence of innovation and knowledge management in services, or across service value chain or networks exists, empirical evidence in the context of collaborative organisational structures in the Supply Chain Management area related to manufacturing industries has started to surface [8] [42] [21] [57] and [61]. As for the service industry, lack of empirical evidence and the urge for greater productivity, and the multi-dimensional functional, structural, operational and organizational aspects of the service industry require further investigation. In this context, the authors will elaborate the impact of technovation on the service creation, strategy, operations and value creation of traditional and collaborative service organisational structures through development of an enhanced services classification, with illustrations across a number of service industries previously classified under Schmenner's latest framework [69].

III. SERVICES CLASSIFICATION AND THE SERVICES CUBICLE

As can be seen from the works of several researchers, in particular the ones highlighting the importance of service classifications [28] [29] [17] [36] [69] [70] [72] and [81], service classifications have been, and are important, for several reasons:

- allows service firms to gain strategic insights based on their position in the matrix and to investigate the strategic changes of service marketing and operations over time
- sheds light on the managerial challenges and presents new ways to manage them,
- leads to enhanced understanding of productivity and value creation for service operations and marketing,
- develops understanding of customer encounters and association with service delivery mechanisms,
- provides insight and rationale into service companies accepting change when and why, and finally helps to explain trends on how some leading service companies have been able to sustain their competitive positions for decades and are evolving at a pace faster than the overall economy in order to survive in the future,
- provide Managers with a structural management tool set which educates and guides them in addressing the challenges of the dynamic service industry.

Recently, [1] posited a number of key questions that are critical to service firms in evaluating the potential for success and repositioning their organisational strategies:

- Should the service classification be directed at just internal operations, on a customer-supplier one-to-one relationship basis, or should it be derived based on internal and external operations which affect the service offering, hence striking an optimal balance for information sharing amongst key players at inter- and intra-organisational level?
- Should the service continue to be purely based on technical characteristics of the delivery medium, service-specific attributes, customer focus or throughput time, or a combination of these attributes as they have been done to-date? In fact, in addition to the earlier listed characteristics, should the service classification analysis include more complex factors of technovation, service channels and organisational structures?
- Is the impact of information, technology, knowledge, relationship and overall processes known, understood, and considered feasible in the context of a global service offering with a global service delivery process?
- As alliances and collaborations are formed among stakeholders, how does the core firm strategically package its services and reposition itself amidst other stakeholders and the industry overall, such that the resulting service offering fulfils market segment specific customer expectations?
- Do firms have the ability to assess their strategic position in the global market with respect to relative cost efficiency, productivity, value adding, profitability, and above all customer satisfaction, in relation to other existing services or equivalent service offerings, as to facilitate the analysis of make-or-buy decisions?

The diversity of the service sector, its globalisation, changing business processes, rapid influx and use of web enabled services, along with the inception of service value-chain management concepts demand a new service management paradigm. In light of the deployment of e-commerce, service industries are transforming radically the manner in which firms operate within a context of globalisation and service delivery mechanisms, thereby creating new service industry and market opportunities, with ongoing progression and dynamic ways of converting tangibles to intangibles (and vice versa) along a specific industry service value chain. For example, with the advent of broadband and internet, there is major competition amongst various industry players – TV, telephone service providers and internet, popularly known as the Triple Play. As a consequence, companies like Telstra Corporation in Australia and SBC in USA, both prime providers of telecommunication services, are lately positioning themselves with new generation service packages including services such as video-on-demand, and example that will be elaborated on later in greater detail.

Recently [1] developed a new theoretical services classification scheme, based on [69] framework, by introducing a third dimension to classify services in ways that transcend current industry boundaries, and which addresses upcoming service business trends that deploy technology and e-commerce.

In [72] the movement of services from Professional Services to Service Factory along the productivity diagonal is due to the use of technology, innovation and standardisation in processes, caused by the relative split of front-end and back-end functions, but all in the context of internal firm service operations. Innovation and technological change are without doubt the main drivers of economic growth at organisational, sector and economy-wide levels, which means technovation is the basis for future economic growth. A strong and well-developed innovation system and culture will underpin economic growth and social well being.

It is to be noted that the use of technology and e-commerce in the earlier 2X2 matrix of [72] refers to internal operations, and is distinct from the usage in the context of inter- and intra-organization structures. Our social infrastructures

and inherent knowledge experiences play a vital role in relationship and information management in facilitating service encounter design and service delivery across value networks. Hence, this new dimension “degree of technovation” is a key element of a service business process and is pivotal in the new service classification scheme. In

response to these dynamics, traditional organizational structures are adopting clusters, value nets, value chains and holonic structures with fuzzy boundaries in a virtual or physical sense, which leads to the definition of collaboration. Collaboration as defined by [2] means establishment of inter-weaved and loosely-coupled multi-directional service relationships, belonging to the same or different industry value chains, whilst leaving room for firms to manoeuvre, enter and exit alliances or networks, in the quest for identifying value propositions.

In the three dimensional Service Cubicle framework, [1] have introduced the degree of technovation (technovation and collaboration) as a third dimension, comprising the use of technology and e-commerce, along with new organisation structures as a result of collaboration (from loosely coupled alliances across multiple industries, to partnering, virtual network consortia etc.) in conjunction with degree of relative throughput (measured for a service transaction as compared to others in the industry) and degree of variation (customisation for and interaction with customers). For the purpose of this theoretical construct the joint measure of degree of technovation has a high value when a service displays both a high technovation and a high degree of collaboration. Similarly, when both individual measures are low, the joint measure of degree of technovation has a low value. In a situation when a mix of high technovation and low collaboration (or vice versa) exists, the joint measure of degree of technovation falls somewhere in between the two extremes. Naturally, not all services will cluster neatly around the productivity diagonal; nevertheless the grading will be helpful in classifying a whole host of diverse services across this 3-3 matrix.

The Service Cubicle framework [1] is illustrated in Figure 1 with Service Factory (SF), Service Shop (SS), Mass Service (MS) and Professional Service (PS), with the Degree of Technovation being assigned the scale from Low to High.

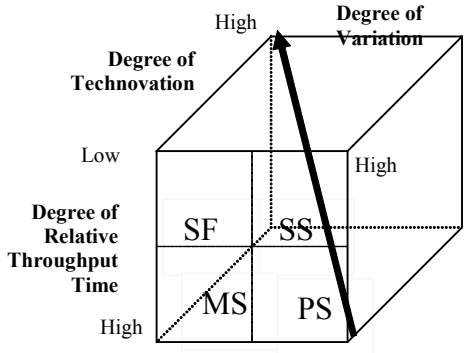

Figure 1 : The Service Cubicle Framework

IV. INDUSTRY EXAMPLES OF THE SERVICES CUBICLE CLASSIFICATION

Using some of the industry examples which Schmenner [72] and [69] referred to in his previous models, our focus identifies proposed shifts and impact of the degree of technovation in today's service developments. Similarly to Schmenner's [69] 2-dimensional service process matrix, the cubical diagonal of the 3-dimensional matrix brings attention to distinctions that have revolutionized delivery of services and may hence show the path to increased productivity, but not necessarily to profitability. If there is any relationship to profitability, it may be purely due to an increase in productivity. This is still to be established in future empirical validation of both classification schemes.

We now turn to a detailed discussion of this service classification with relevant service industry examples belonging to each of the four quadrants of the framework, as originally presented by Schmenner.

A. Industry Example 1: Telecommunications Industry and Film/Television/Video-CD Industry

The traditional telecommunications industry faces a threat to its traditional voice services, with cable companies like Cox in the U.S. offering phone call and high-speed internet access over its cable in competition with local phone companies. Further, with the advent of broadband and internet, there is major competition amongst various industry players – Television, telephone service providers, and internet, popularly known as the Triple Play. Regulatory requirements for phone and cable services are different in different countries, eg. in Australia, Telstra Corporation who owns half the cable, and SBC, a phone company in the USA which owns no cable, while both are prime providers of telecommunication services. In response to competition generated by different value chain services, cable providers and power companies providing broadband services at TV channel speeds are lately positioning themselves with new generation service packages, including services such as video-on-demand.

Video-on-demand services affect the service value chains of several industries, grouped as telecommunications (telephony, internet broadband access and Television), and multimedia (Television/film industry, sports and entertainment, and retail purchase/rental of DVD), respectively. This example is unique in the sense that two major industry chains, offering a multitude of service offerings via different channels while meeting different market segments, are affected as a result of technovation. This is further elaborated on below in how the two separate and diverse industries are affected, and how technology innovation creates opportunity for new markets and new channels with new service delivery methods, which eventually results in an elevated win-win value proposition for all partners involved.

Several telecommunication service providers are taking a lead and provide video-on-demand services packaged as part of their traditional telephony and internet services, which cover a range of sports, entertainment and film related services. On the other hand, companies, like Cox in the USA, represent pure cable services providers that are packaging their core broadband internet services with telephony, and video-on-demand services. Benefits are greatly realised by the film industry from a pirating perspective, traditional telecommunication and cable service providers from the perspective of ancillary services which are slowly becoming core of the operations, and end customer with a unique service experience (the value add) whilst at home. Further, through the use of CISCO consumer electronic devises that sit beneath televisions and receive wireless signals from broadband connected computers, the downloading of pay movies and reproduction of internet content on other TV screens around the home, will be readily available. This provides the home theatre viewers with an innovative means of fulfilling the home experience within flexible and accessible reach. These new service offerings are indeed feasible only because of technovation, due to the partnering and collaboration among stakeholders of different value chains, resulting in alteration of service value chains, transformation of complete organization structures, or resulting in some form of networked collaboration.

However, this downloading of movies may pose a threat to the operations of several other service industries - CD/Video shops, movie theatres, and multimedia/film entertainment; unless innovation provides a difference in experience that appeal to customers. In a similar vein, if films were to be released directly to the internet on a pay per view system at some point in time after the release of the film, it may prevent the illicit pirating which then in turn benefits the film industry. Another school of thought suggests that internet awareness for a particular movie may more than offset the negative side effect of pirating resulting in growth for the industry. Irrespective, the film industry needs to find ways to capture this lost market or take advantage of the growth in the market – encoding films such that they could not be saved, or watched once only so that there is a market for DVD when purchased later, and the likes.

As we all know, traditionally two decades ago, the notion of movie theatres becoming obsolete was raised when video renting became popular. For an increasing number of people, going to the cinema was an outdated notion, especially when it is more comfortable to stay home and watch a film in your own private home theatre. But the creation of movieplex-facilities proved to be a huge success, creating a social "night out" experience, rather than a pure movie experience. In a similar vein, as people are becoming more and more comfortable watching movies in their own home theatres at a cheap price with access round the clock, the movie theatre business needs to provide a difference in experience in order to survive and remain competitive. An experience that concatenates the sensory and physical real-time Disneyland experience with the 3-d IMAX theatre visual impacts, may be an example of the next wave of new customer experiences in this regard.

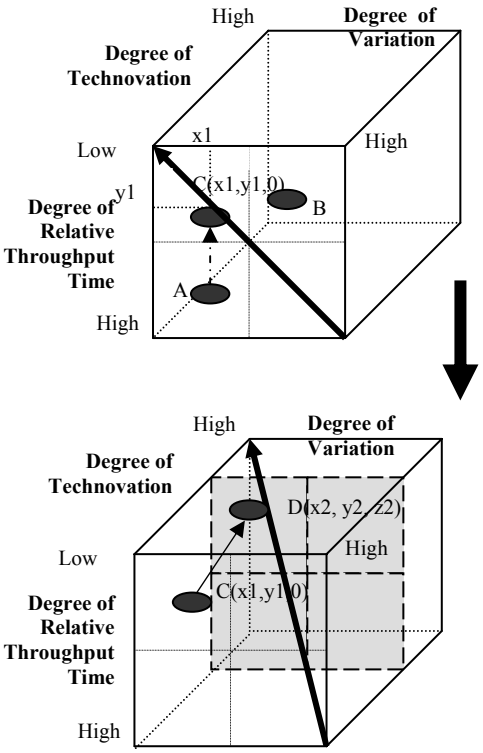

Figure 2 : The Service Cubicle Framework as applied to Telecommunications services

Whilst these developments are purely based on technological developments, the different players in the industry must strategically position themselves whilst working collaboratively, and must redesign service offerings to meet different market segments accordingly. According to [69] and referring to Figure 2, back-of the house operations of telephone services (network connection design and operations etc.) would be classified under Mass Services at A, while front-end activities (ordering etc.) would be classified as a Service Shop seen at B. However, due to technology advancements in the telephone infrastructure and operational management systems, telephone services and features (calling line display, call waiting etc.) under [39] have re-classified telephony services as a Service Factory shown at C(x1,y1,0). Technovation, in broadband internet in particular, has impacted several industry value chains, some favourably and some adversely. Based on the new proposed framework, this new service-offering proposition as discussed above is placed at D(x2, y2, z2) in a 3X3 'service cubicle' framework, with the new service offering placed at the high end of the degree of technovation, relatively reduced degree of relative throughput and degree of variation such that x2<=x1, y2<=y1 and z2>0 as shown in Figure 2.

B. Industry Example 2: Retail Banking Industry

Banking is a service industry that continues to be changed by trends such as deregulation and advances in technology. With the introduction of ATM's in the late 1960's, bank customers were able to draw cash twenty four hours a day and could do functions such as dispense cash, accept deposits, transfer funds, and provide information on account balances. In the process, banks have already formed co-operations, as well as nationwide and global networks, that enable a customer of one bank to use an ATM of another for cash access worldwide. Although ATM's are a mature technology and its wider application is a proven example of technovation and partnering, as well as a proven delivery channel for banks, internet e-commerce applications have further changed the way people do their banking thus impacting the operations of this industry. Customers can now manage and access account information and transfers, online bill payment, and financial investment services via e-banking and bpay. Since the turn of the century, the adoption of e-banking has greatly increased, with twenty percent of people with internet access now using online banking facilities [27]. The result is less human contact and more self-service with increased standardization, thus improving productivity. Further, [51] point out that it has been very difficult to get mature customers accept ATM and internet banking that cover the entire suite of regular banking services. Yet the fear of security breaches has been a major issue, and banks have tried to respond by emphasizing the benefits of ATM at the teller line, while increasing security measures for internet-based transactions as technology advances [73].

Schmenner [69] classifies retail banking with ATM banking included at F as a "Service Factory" in Figure 3, as opposed to "Mass Services" as shown at E in Schmenner [72] framework for reasons explained in there.

Although ATM is a result of technology development , yet is a completely different delivery channel for delivering retail banking and to-date has been successfully deployed, the authors believe that this service should have been deployed in a frame other than z=0, ie. Z3>0 say as positioned at G(x3,y3,z3). It appears that under the frame z=0, lower throughput times and/or less variation was achieved as a result of the banking operations that had changed overtime resulting in greater productivity. Hence, the transition should have been from Mass Service to Service Factory ie. E to G, with improvements in productivity and further complemented with technology initiated value-add benefits by the use of ATM, Credit Cards, and internet banking. This in turn results in global access (for frames z>0) where technology has not only transformed the design of the service itself, but has changed the operations that delivers this retail banking service to its customers via different delivery channels. This development clearly highlights the role of technology, collaborative inter and intra working of banks and other organisations, existence of several delivery channels right from plain old days of pass-books, cheque books to bpay options, credit card facility, ATM, and internet banking with withdrawal, deposit and transfer options from anywhere in the world at a flash. Not only has the transition resulted in improved productivity and efficiency of organisations, in fact has given bank customers full management control of their finances which has resulted in greater customer satisfaction. Several flexible delivery options exist, from the most primitive to the most advanced, with each delivery option having its own pros and cons, however it is the management of these options that poses challenges to the owners' of this industry. Under this new schema, it would be appropriate to position retail banking within the Service Factory cubicle, with z>0, such that it has a low to medium technovation and low to medium collaboration, resulting in placing this service offerings at G (z4>0, x4<=x3, y4<=y3).

With technology expected to further advance, further benefits could potentially be realised with the use of voice recognition technology (VRT) in the area of retail banking, which recognises individual signature traits in the voice (rather than the words themselves), and has now advanced to such a stage as to be a reliable way of identifying a person. This technology would be especially useful as a way of uniquely identifying customers using ATM's, negating the need to carry cards or memorise pin numbers. This VRT associated banking technique could be used to improve the banking service value chain by making it unnecessary to carry bankcards, banks not required issuing them, and the like. Further, the same VRT banking technique could also be used to legally identify ones self while engaged in internet banking from anywhere in the world, thereby abolishing time and spatial differences. Banks are now partnering with telecommunications service providers to trial out these banking service delivery channels, which will lead to further partnering across industries as shown at H, and will affect the banking value chain industry with the VRT ATM/internet banking etc being repositioned at H (x5, y5, z5) such that x5<=x4, y5<=y4 with z5<=z4 and z5>0 which positions this service offering with high technovation and high collaboration, resulting in higher degree of technovation.

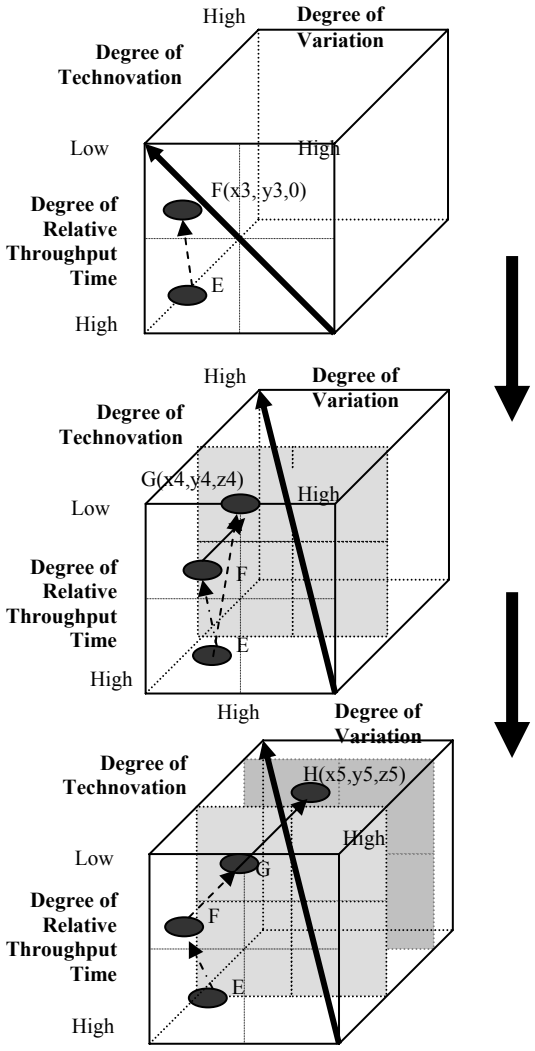

Figure 3 : The Service Cubicle Framework as applied to the Banking Retail Industry

C. Industry Example 3: Medical/Health Industry

Schmenner [69] argued that hospitals originally were a Service Shop placed at I which over time, due to innovations, had a trend to convert to for-profit hospitals as shown at K, with reduced customer interaction, customization, and relatively reduced labour intensity. However, [91] draw attention to both growing user/customer dissatisfaction with mass production to individual problems, and the growing power of users to find their information on the web, leading to user/patient having greater control and ability to query their treatment. This indeed poses challenges to the medical industry and hence, in an effort to improve healthcare delivery, globalisation and advancements in technology enable a delivery shift from highly concentrated performance locations (eg. Hospitals) to virtual delivery environments such as telecare/telemedicine [15] which allow for delivery of healthcare to remote patients and facilitating information exchange between generalists and specialists. The primary contribution is the importance of the [4] presents evidence for telemedicine technologies which can be traced to the pre-electronic era, addresses the need to address unfulfilled necessities in terms of medical services using telemedicine technologies with user involvement as a growing feature, more in the context of healthcare systems for organisations, nations and worldwide organisations [87] [55] [15] [4] and [33]. Further, [4] presents an internet-based telemedicine environment specifically tailored for Nigeria, which fulfils its government's aim of bringing useful healthcare to rural and outlying areas.

As an example, with the aid of mobile and wireless technology, Telemedicine kiosks trial processes that support emergency health care. A consortium drawn from 10 countries – the USA, Britain, Australia, Japan, Korea, India, Indonesia, Bhutan, Greece and France, has been developing these kiosks. [71] highlighted that nations where groups of companies routinely pursued "swift, even flow", should industrialise more quickly, and to a greater extent, than those nations whose companies did not pursue swift, even flow in their processes. If this is true, then medical facilities in developing countries need to move within an alliance structure where researchers, doctors, and institutions are all collaborating. The resulting value add is the provision of such services as mentioned above, made possible by new technology applications and the creation of new service delivery channels through collaborating consortia of industry partners.

One can easily envision the progression of such services beyond emergency services, to include more advanced applications such as heart scans and medical diagnostics made available to places where these services are currently non-existent. E-health systems exhibit a range of applications, including emergency telemedicine, epidemic control, and combating bioterrorism, all which can be worked towards. While these solutions certainly have promises, there are a number of challenges and implementation issues which require attention, the key one being organisation and cultural inertia across nations and organisations, security and privacy, as well as the exploitation of technology and information systems in an informed manner. The value-add of these type of service offerings is self-evident, and will result in a shift in productivity for under- developed market segments as shown in Fig 4, in an attempt to establish a medical system which can enhance citizen's equality in the availability of medical facilities. Hence, at this stage, it would be appropriate to position traditional medical/hospital industry still within the Service Shop quadrant at K(x7,y7,z7), with telemedicine moving towards a Service Factory at L (x8,y8,z8), such that it has a medium technovation and low collaboration, resulting in placing this service offerings at L such that z8=>z7=>0 , x8<=x7<=x6, y8<=y7<=y6).

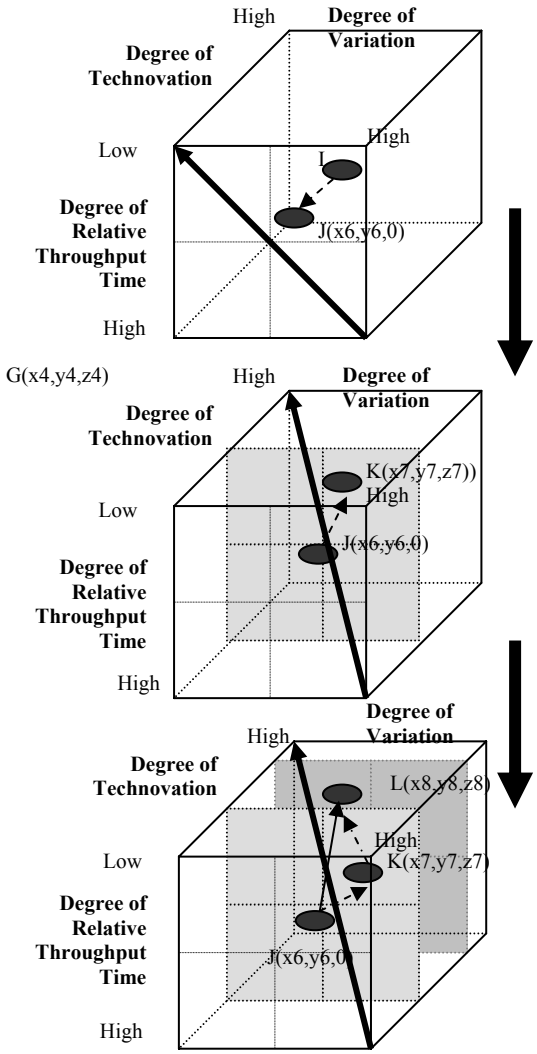

Figure 4 : The Service Cubicle Framework as applied to the Medical/Health Value Chain

D. Industry Example 4: Professional Services Industry

Under the old SPM framework Schmenner [72] classified professional services provided by architects, consultants, doctors, tax accountants, lawyers and other professional's lies within the Professional Services quadrant. However, Schmenner [69] in his revised framework placed the traditional tax accountants still at the same place, where the customization and interaction (variation) was great and the relative throughput time (order-to-delivery) was high at M(x9,y9,0). In contrast, Schmenner positioned firms such as H&R Block (new business organisational structures), which are more focussed on individual tax returns etc and require less customization, interaction and relative throughput times, in the Service Factory quadrant at N(x10,y10,0). This is illustrated in Figure 5.

Since the beginning of the office-technology boom of the 1980's, in a similar vein lawyers have been accused of being fearful and reluctant to adopt modern technology, and have often been compared unfavorably in this regard to accountants and even doctors. In particular, focusing on the legal professional services, a more objective view of lawyers demonstrates that they adopt effective technology with enthusiasm when the tools are appropriate for the professional tasks they face. However, over time the mere introduction of paralegal staff for supporting the back-end office activities demonstrates the ability of lawyers to change and focus on their distinct and core activities, even though reluctantly, thereby placed in the Service Factory-quadrant by Schmenner [69] at N.

In an era of technological advancements and internet, most law firms are experiencing dramatic changes and are forced to evaluate the way in which they will conduct business with their clients with particular emphasis on productivity of legal staff, cost control and operational efficiency. As clients demand new services and immediate access to attorneys and information, at all times of the day from anywhere, law firms have started to realise the potential of deploying integrated knowledge management systems in an urge to put a new focus on high-value service delivery rather than on billable, hour-based matters. Legal market regulation in the UK is on the way to significant liberalization, which possibly may affect the development of online legal services. [90] reports that the British government will move to adopt the Clementi Commission recommendation that "will allow outside investors to own law firms and other professionals to form partnerships with solicitors". Through the use of information technology, [38] presents links between knowledge sharing attitudes, reward attitudes and use of IT and demonstrate how stimulating knowledge sharing, storage and dissemination of information and providing tools and rewards are important

Against this backdrop, law firms are now seeking innovative solutions and technology applications, in conjunction with new ways to lift barriers to collaboration, including outsourcing and off shoring some of their non-core legal activities. Whilst the effective implementation and roll-out of these knowledge based systems may take time, it is evident that functions such as automated document management, legal research, self-service research tools, query databases, portals, data mining, practice management and transactional systems will form the strategic asset of the adaptable and multiservice legal firms. CISCO's untethered Intelligent Information System [88] and LexisNexis Total Search solutions [89] are solid evidence of such legal management systems. As these changes will happen over a period of time, the authors place these novel legal service offerings as high value-add professional services, made up of medium technovation and medium collaboration components, still requiring customisation and interaction with clients but with relatively lower throughputs, placed still the Professional Services-quadrant at P(x12,y12,z12) in Figure 5. In contrast, the more traditional paralegal functions followed by outsourced, off shored, and online legal functions are placed in the Service Factory quadrant at O(x11,y11,z11),

made up of high collaboration, high technovation, low customer interaction and customisation, with very low throughput such that x12>=x11,y12>=y11, z12>=z11 (see Figure 5).

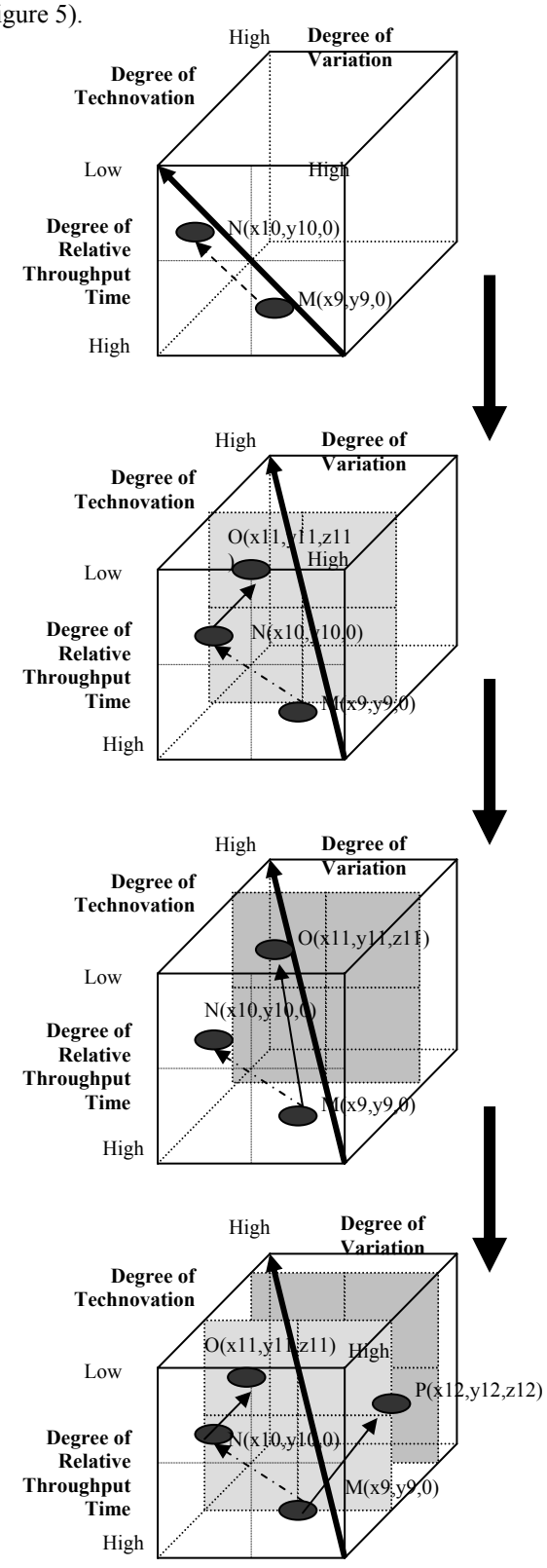

Figure 5 : The Service Cubicle Framework as applied to the Professional Services Value Chain

Specific managerial challenges confronting law firms include maximising productivity and efficiency, network resilience, increased mobility, collaboration support, flexibility, security and network administration. Based on innovative solutions, collaboration and technology, law firms can design and devise service offerings to suit clients demands, differentiate themselves from competitors, and contain costs. As technovation advances and as law firms forge closer relationships with clients, the Service Cubicle will provide legal firms with a tool to visualise the impact of operationalizing different service offerings relative to varying value-add outcomes. They in turn will enable legal firms to strategically reposition themselves as they strive to become more services-centric, with respect to the industry or the consortium.

V. BENEFITS FROM A SERVICE CUBICLE CLASSIFICATION

As evident from the above industry examples, the new service classification offers a template for discussing the requirements of service offerings based on factors that are mission-critical to service industries.

Once a service offering is positioned in the cubicle, this taxonomy provides service firms a framework and a means for management of these services under dynamic conditions. It offers a template for strategic discussion, which may address issues such as:

- how new technology and IT may bring organisational, relationship and process changes in a firms strategic outlook leading to new ways of marketing the elevated service offerings, access to innovative customers and/or markets,
- how introduction of a newly deployed technology for sale of goods may trigger innovative ideas in a completely diverse and different service industry and bring process change, organisational structural change leading to collaboration with other industry chains leading to change in the role of the intermediary,
- how application of knowledge experienced in one situation may lead to innovation in creation and design of a new service portfolio in a totally diverse industry or situation,
- how unification with other industry partners may lead to delivering collaborative service offerings, with the service still under the control of the prime service provider, leading to establishment of Services Value Network Consortia's,
- how organisations may see the need to reposition and realign themselves strategically, tactically and operationally whilst managing risks, sustainability and fit in an attempt to introduce new service offerings,
- how new service offerings require changes in operational service delivery processes, customer and stakeholder touch points and the role of intermediaries resulting in greater customer/client satisfaction and reduced impact of uncertainty,

- how technovation and collaboration may lead to collaborative value-add in the form of reduced throughput times, reduced customisation and interaction, increased number of new service offerings, delivery channel options, increase in trust and openness amongst stakeholders, plug-and-play organisational structures and many more, and
- how introduction of new services impact productivity and collaborative value-add vis. the impact on service specific attributes, throughput times, delivery channel options, organizational changes, technological and process implications, hence may assist in optimally managing risks and uncertainties linked to business.

VI. CONCLUSIONS

Service organizations increasingly organize themselves and operate on a value chain level, in response to new ways in which services can be marketed, branded, operated and delivered in today's digital economy. This creates important challenges and opportunities, which call for a realignment of strategic focuses, in particular with respect to the impact of technovation on service creation and services modus operandi, their resulting service classification, and the restructuring amongst different service value chain industries.

This research builds on a recently developed classification scheme, referred to as the Services Cubicle that transcends current industry boundaries and includes upcoming service business trends in technovation. The paper subsequently illustrates a variety of service industry examples in order to clarify the resulting service classifications, taking into account deployment of varying degrees of technovation in that industry. These examples were carefully selected in relation to recent service process classifications by Schmenner, and were compared to his earlier classification scheme.

Once a service offering is positioned in the cubicle, this taxonomy provides service firms a framework and a means for management of these services under dynamic conditions. It offers a template for strategic discussion, in order to better position, align, assess and validate the impact of their changing service offerings, whilst addressing the complexities of strategic alignment, value positioning, asset definition; as well as technology, process, knowledge and relationship management.

REFERENCES

Available on request from the authors.